

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Weigl et al.

: Group Art Unit: 1743

Serial No. 09/724,308

: Examiner: Not assigned

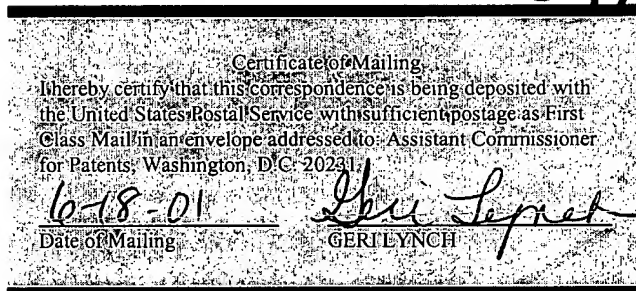
Filed: November 28, 2000

For: MICROFABRICATED  
DIFFUSION-BASED  
CHEMICAL SENSOR

1743  
#  
4  
RECEIVED

JUN 22 2001

TC 1700



INFORMATION DISCLOSURE STATEMENT

Asst. Commissioner of Patents  
Washington, D.C. 20231

Sir:

This application is a continuation of U.S. application 09/426,683 filed October 25, 1999, which is a continuation of U.S. application 08/829,679 filed March 31, 1997, now U.S. Patent No. 5,972,710 issued October 26, 1999, which is a continuation-in-part of U.S. application 08/625,808 filed March 29, 1996, now U.S. Patent No. 5,716,852 issued February 10, 1998. This application also claims priority to U.S. Application 09/703,764 filed November 1, 2000, which is a continuation-in-part of co-pending application no. 09/500,398, filed February 8, 2000, a continuation of application no. 09/346,852 filed July 2, 1999, which is a divisional application of application no. 08/663,916 filed June 14, 1996, now U.S. Patent No. 5,932,100 issued August 3, 1999, claiming priority to application no. 60/000,261 filed June 16, 1995. For the Examiner's convenience, PTO-1449 forms listing references cited by applicants and the Examiner in these cases along with copies of the references are enclosed.

Also, the Examiner is requested to consider the additional references listed on the PTO-

1449 form entitled "newly cited" enclosed along with copies of the references,  
which may qualify as prior art.

References listed in the PTO -1449 forms submitted herewith which do not specify the month of publication have a year of publication sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue.

In compliance with the duty of disclosure set forth in 37 CFR 1.97, the Examiner is referred to the files of those applications for prior art of record. For the Examiner's convenience, copies of the 1449 forms in those cases are enclosed.

It is believed that this submission does not necessitate the payment of any fees; however, if this is incorrect, please charge any requisite fee to Deposit Account 07-1969.

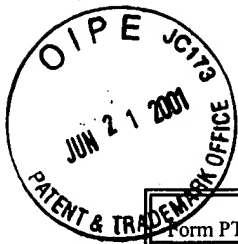


Respectfully submitted,

*Ellen P. Winner*

Ellen P. Winner  
Reg. No. 28,547

GREENLEE, WINNER AND SULLIVAN, P.C.  
5370 Manhattan Circle, Suite 201, Boulder, CO 80303  
Telephone: (303) 499-8080; Facsimile: (303) 499-8089  
gal: June 18, 2001  
Attorney Docket No. 6-96C



Sheet 1 of 1

RECEIVED

Form PTO 1449		
ATTY DOCKET NO. 6-96C	SERIAL NO. 09/724,308	FILING DATE November 28, 2000
APPLICANT Weigl et al.		GROUP 1743

JUN 22 2001

TC 1700

Newly-cited references

## U.S. PATENT DOCUMENTS

Exmr. Initial		Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
		6,159,739	12/12/00	Weigl et al.	436	52	
		5,747,349	05/05/98	van den Engh et al.	436	172	

## FOREIGN PATENT DOCUMENTS

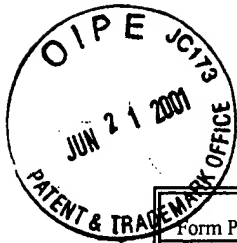
		Document Number	Date	Country	Class	Subclass	Translation Yes/No

## OTHER PRIOR ART (including Author, Title, Date, Pertinent Pages, etc.)


EXAMINER

DATE CONSIDERED

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Sheet 1 of 6

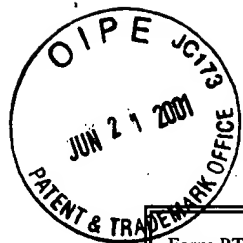
Form PTO 1449		
ATTY DOCKET NO. 6-96C	SERIAL NO. 09/724,308	FILING DATE November 28, 2000
APPLICANT Weigl et al.		GROUP 1743

RECEIVED  
JUN 22 2001  
TC 1706

Previously cited references

## U.S. PATENT DOCUMENTS

Exmr. Initial	Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
	3,449,938	06/17/69	Giddings	73	23	
	3,795,489	03/05/74	Warnick et al.	23	254 R	
	4,147,621	04/03/79	Giddings	210	22 C	
	4,214,981	07/29/80	Giddings	209	155	
	4,250,026	02/10/81	Giddings et al.	209	155	
	4,683,212	07/28/87	Uffenheimer	436	52	
	4,726,929	02/23/88	Gropper et al.	422	68	
	4,737,268	04/12/88	Giddings	209	12	
	4,756,884	07/12/88	Hillman et al.	422	73	
	4,830,756	05/16/89	Giddings	210	739	
	4,894,146	01/16/90	Giddings	209	12	
	4,908,112	03/13/90	Pace	204	299	
	5,007,732	04/16/91	Ohki et al.	356	73	
	5,039,426	08/13/91	Giddings	210	695	
	5,141,651	08/25/92	Giddings	210	748	
	5,156,039	10/20/92	Giddings	73	1 R	
	5,193,688	03/16/93	Giddings	209	155	
	5,240,618	08/31/93	Caldwell et al.	210	748	
	5,250,263	10/05/93	Manz	422	81	
	5,288,463	02/22/94	Chemelli	422	58	
	5,304,487	04/19/94	Wilding et al.	435	291	
	5,322,626	06/21/94	Frank et al.	210	634	
	5,389,524	02/14/95	Larsen et al.	435	29	
	5,465,849	11/14/95	Wada et al.	209	214	



Form PTO 1449		
ATTY DOCKET NO. 6-96C	SERIAL NO. 09/724,308	FILING DATE November 28, 2000
APPLICANT Weigl et al.		GROUP 1743

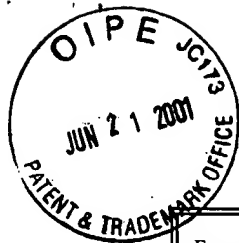
Previously cited references

**RECEIVED**

JUN 22 2001

**TC 1700**

		5,480,614	01/02/96	Kamahori	422	70	
		5,599,432	02/04/97	Manz et al.	204	451	
		5,599,503	02/04/97	Manz et al.	422	82.05	
		5,637,469	06/10/97	Wilding et al.	435	7.21	
		5,635,358	06/03/97	Wilding et al.	435	7.2	
		5,498,392	03/12/96	Wilding et al.	422	68.1	
		5,549,819	08/27/96	Nickerson	210	511	
		5,534,328	07/09/96	Ashmead et al.	210	97	
		5,554,339	09/10/96	Cozzette et al.	422	69	
		5,571,410	11/05/96	Swedberg et al.	422	69	
		5,585,011	12/17/96	Saaski et al.	216	56	
		5,585,069	12/17/96	Zanzucchi et al.	422	100	
		5,587,128	12/24/96	Wilding et al.	435	287.3	
		5,603,351	02/18/97	Cherukuri et al.	137	597	
		5,605,662	02/25/97	Heller et al.	422	69	
		5,618,432	04/08/97	Rewitzer et al.	210	634	
		5,632,957	05/27/97	Heller et al.	422	69	
		5,639,423	06/17/97	Northrup et al.	435	287.3	
		5,674,743	10/07/97	Ulmer	435	287.2	
		5,681,484	10/28/97	Zanzucchi et al.	216	56	
		5,707,799	01/13/98	Hansmann et al.	435	6	
		5,716,852	02/10/98	Yager et al.	436	172	
		5,726,751	03/10/98	Altendorf et al.	356	246	



Sheet 3 of 6

Form PTO 1449		
ATTY DOCKET NO. 6-96C	SERIAL NO. 09/724,308	FILING DATE November 28, 2000
APPLICANT Weigl et al.		GROUP 1743

Previously cited references

		5,842,787	12/01/98	Kipf-Sill et al.	366	340	
		5,869,004	02/09/99	Parce et al.	422	100	
		5,932,100	08/03/99	Yager et al.	210	634	
		5,961,832	10/05/99	Shaw et al.	210	85	
		5,971,158	10/26/99	Yager et al.	209	155	

RECEIVED  
JUN 22 2001  
TC 17C

FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Subclass	Translation Yes/No
		WO 97/02357	23.01.97	PCT	C12P 19/34		
		WO97/00125	03.01.97	PCT	B01F 5/06		
		WO96/15576	23.05.96	PCT	H92K 44/02		
		WO96/12541	02.05.96	PCT	B01D 11/04		
		WO96/12540	02/05/96	PCT	B01D 11/04		
		WO96/04547	15.02.96	PCT	G01N 27/00		
		WO93/22421	11.11.93	PCT	C12M 3/00		
		WO93/22058	11.11.93	PCT	B01L 7/00		
		WO93/22055	11.11.93	PCT	B01L 3/00		
		WO93/22053	11.11.93	PCT	B01L 3/00		
		WO93/22053	11.11.93	PCT	B01L 3/00		
		0 294 701 B1	14.12.88	EP	G01N 15/14		
		0 381 501 A2	08.08.90	EP	B01L 3/00		
		0 645 169 A1	29.03.95	EP	B01D 21/00		



Form PTO 1449		
ATTY DOCKET NO. 6-96C	SERIAL NO. 09/724,308	FILING DATE November 28, 2000
APPLICANT Weigl et al.		GROUP 1743

Previously cited references

## OTHER PRIOR ART (including Author, Title, Date, Pertinent Pages, etc.)

		Afromowitz, M.A. and Samaras, J.E., (1989), "Pinch Field-Flow Fractionation Using Flow Injections Techniques," <i>Separation Science and Technology</i> 24(5&6):325-339
		Brody, J.P. and Yager, P. (June 1996), "Low Reynolds Number Micro-Fluidic Device," <i>Solid State Sensor &amp; Actuator Workshop, Hilton Head, SC, June 2-6</i> , pp. 105-108
		Chmelik et al., (1991), "Isoelectric focusing field-flow fractionation," <i>J. Chromatography</i> 545(2):349-358
		Elwenspoek et al., (Dec 1994), Towards, Integrated Microliquid Handling Systems," <i>J. Micromech. Microeng.</i> 4:227-245
		Faucheux, L.P. et al. (Feb 1995), "Optical Thermal Ratchet," <i>Phys. Rev. Letters</i> 74:1504-1507
		Forster et al., (Nov 1995), "Design, Fabrication and Testing of Fixed-Valve Micro-Pumps," <i>Proceeding of the ASME Fluids Engineering Division, ASME. FED</i> 235:39-44
		Fu et al., (1993), "Rapid Diffusion Coefficient Measurements Using Analytical SPLITT Fractionation: Application to Proteins," <i>Anal. Biochem.</i> 208:80-87
		Gravesen et al., (1993), "Microfluidics - a review," <i>J. Micromechanics and Microengineering</i> 3:168-182
		Giddings, J.C., (1988), "Continuous Separation in Split-Flow Thin (SPLITT) Cells: Potential Applications to Biological Materials," <i>Sep. Sci. Technol.</i> 23(8,9):931-943
		Giddings, J.C. (1985), "Optimized Field-Flow Fractionation System Based on Dual Stream Splitters," <i>Anal. Chem.</i> 57:945-947
		Giddings, J.C. et al. (1983), "Outlet Stream Splitting for Sample Concentration in Field-Flow Fractionation," <i>Separation Science &amp; Technology</i> 18:293-306
		Giddings, J.C. (June 1993), "Field-Flow Fractionation: Analysis of Macromolecular, Colloidal and Particulate Materials," <i>Science</i> 260:1456-1465
		Harrison et al., (Aug 1993), "Micromachining a miniaturized capillary electrophoresis-based chemical analysis system on a chip," <i>Science</i> 261:895-897
		Kittilsand, G. and Stemme, G., (1990), "A Sub-micron Particle Filter in Silicon," <i>Sensors and Actuators A21-A23</i> :904-907
		Leff, H.S. and Rex, A.F. (Mar 1990), "Resource letter MD-1: Maxwell's demon," <i>Am. J. Physics</i> 58:201-209

RECEIVED  
JUN 22 2001  
TC 1706





Form PTO 1449		
ATTY DOCKET NO. 6-96C	SERIAL NO. 09/724,308	FILING DATE November 28, 2000
APPLICANT Weigl et al.		GROUP 1743

Previously cited references

RECEIVED  
JUN 22 2001  
TC 1700

		Levin, S. and Tawil, G., (Sept 1993), "Analytical SPLITT Fractionation in the Diffusion Mode Operating as a Dialysis-like system Devoid of Membrane. Application to Drug-Carrying Liposomes," <i>Anal. Chem.</i> <b>65</b> :2254-2261
		Manz, A. et al. (1993), "Planar Chips technology for miniaturization of separation systems: A developing perspective in chemical monitoring," <i>Advances in Chromatography</i> <b>33</b> :1-66
		Petersen, K.E. (May 1982), "Silicon as a Mechanical Material," <i>Proc. IEEE</i> <b>70</b> (5):420-457
		Ramsey et al., (Oct 1995), "Microfabricated chemical measurement systems," <i>Nature Medicine</i> <b>1</b> (10):1093-1096
		Reisman, A. et al. (1979) "The Controlled Etching of Silicon in Catalyzed Ethylenediamine-Pyrocatechol-Water Solutions," <i>J. Electrochem. Soc.</i> <b>126</b> :1406-1415
		Rousselet, J. et al. (Aug 1994), "Directional motion of brownian particles induced by a periodic asymmetric potential," <i>Nature</i> <b>370</b> :446-448
		Shoji, S. and Esashi, M. (Dec 1994), "Microflow devices and systems," <i>J. Micromechanics and Microengineering</i> <b>4</b> :157-171
		Springston et al., (1987), "Continuous Particle Fractionation Based on Gravitational Sedimentation in Split-Flow Analytical Chemistry," <i>Analytical Chemistry</i> <b>59</b> :344-350
		Verpoorte et al., (Dec 1994), "Three-dimensional micro flow manifolds for miniaturized chemical analysis systems," <i>J. Micromech. Microeng.</i> <b>4</b> :246-256
		Wallis, G. and Pomerantz, D.I. (Sept 1969) "Field Assisted Glass-Metal Sealing," <i>J. Appl. Physics</i> <b>40</b> :3946-3949
		Weigl, B.H. and Yager, P. (Apr 1996), "Silicon-Microfabricated Diffusion-Based Optical Chemical Sensor," presented at Eurotrode Conference, Zurich, Switzerland, April 2-3
		Weigl, B.H. et al. (Feb 1997), "Fluorescence and absorbance analyte sensing in whole blood and plasma based on diffusion separation in silicon-microfabricated flow structures," SPIE Proceedings, J. Lakowitz (ed.), <i>Fluorescence Sensing Technology III</i> (Feb. 9-11)
		Weigl, B.H. et al. (Nov 1996), "Diffusion-Based Optical Chemical Detection in Silicon Flow Structures," <i>Analytical Methods &amp; Instrumentation Special Issue <math>\mu</math>TAS 96</i> , pp. 174-184
		Weigl, B.H. et al. (Nov 1996), "Rapid sequential chemical analysis in microfabricated flow structures using multiple fluorescent reporter beads," <i><math>\mu</math>TAS 96</i> (Nov' 96)



Sheet 6 of 6

Form PTO 1449		
ATTY DOCKET NO. 6-96C	SERIAL NO. 09/724,308	FILING DATE November 28, 2000
APPLICANT Weigl et al.		GROUP 1743

RECEIVED  
JUN 22 2001  
TC 1700

Previously cited references

			Wilding et al., (Jan 1994), "Manipulation and Flow of Biological Fluids in Straight Channels Micromachined in Silicon," <i>J. Clin. Chem.</i> <b>40</b> (1):43-47
			Williams, P.S. et al. (1992), "Continuous SPLITT Fractionation Based on a Diffusion Mechanism," <i>Ind. Eng. Chem. Res.</i> <b>31</b> :2172-2181
			Yue et al., (Sept 1994), "Miniature Field-Flow Fractionation Systems for Analysis of Blood Cells," <i>Clin. Chem.</i> <b>40</b> :1810-1814

EXAMINER	DATE CONSIDERED
<p><b>*EXAMINER:</b> Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</p>	

12/20/89